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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/144,607	08/31/1998	ARTHUR W. CHESTER	10061-1	5000

7590

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EXAMINER

NORTON, NADINE GEORGIANNA

ART UNIT

PAPER NUMBER

1764

DATE MAILED: 12/10/2002

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/144,607

Applicant(s)

CHESTER ET AL.

Examiner

Nadine Norton

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 June 2002.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 5-12, 14-19, 28-31 and 36-41 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-12, 14-19, 28-31 and 36-41 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

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DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6-14-02 has been entered.

Renumbered Claims

The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution. When claims are canceled, the remaining claims must not be renumbered. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

Misnumbered claims 32-37 have been renumbered as 36-41.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out

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the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-3, 5, 7, 8, 10, 28-31 and 36-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beck et al.(4,588,702) in view of Kugler (4,944,864).

The reference of Beck et al.(4,588,702) discloses a process of cracking a hydrocarbon feed containing a sulfur containing compound in the presence of a catalyst. See column 14, lines 13-14 and column 9, lines 29-31. Suitable feedstocks include vacuum gas oils. See column 13, lines 25-30. The process is suitable for the production of a high gasoline cut. See column 11, line 1. The catalyst includes a USY component and a ZSM-5 component. See column 15, line 61 and column 18, lines 41-42 and column 35, line 50. The zeolite component may optionally be combined with a matrix material such as alumina. See column 19, lines 64-66. An acceptable unit cell size ranges from 23.3-24.7 angstroms. See column 16, lines 46-49. The reference further teaches that the catalyst is separated, stripped, regenerated in the presence of oxygen and recycled back to the reaction zone. See column 27, line 51, column 28, line 23, column 29, lines 63-64 and column 30, lines 23-30.

The reference of Beck et al.(4,588,702) succeeds at disclosing a cracking process for the formation of a gasoline product with steps and catalyst components corresponding to those claimed by applicants.

Several differences are noted between the reference of Beck et al.(4,588,702) and applicants' claimed invention. The reference does not disclose the presence of vanadium in an oxidation state greater than 0, a reduction in the sulfur content or the use of a vanadium

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containing catalyst. Beck et al.(4,588,702) does not suggest applicants' catalyst method of making limitations.

The reference of Kugler (4,944,864) is cited to show that it is known in the art that vanadium contaminants in a hydrocarbon feed which remain on a catalyst during regeneration are oxidized and that the oxidized vanadium compounds become mobile and react with the zeolite components of the catalyst. As a result, the regenerated catalyst contains vanadium. See column 4, lines 13-27.

The reference of Kugler succeeds in disclosing the concept that regenerated catalysts which are recycled in processes involving the treatment of vanadium containing feeds contain a vanadium component resulting from contamination during the regeneration process. The vanadium component meets applicants' non-lanthanide transition metal limitation.

Since the reference of Beck et al.(4,588,702) discloses a vanadium containing feed and a catalyst regeneration, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a vanadium containing catalyst because the reference of Kugler teaches that it is known in the art that regenerated catalysts recycled for further cracking contain vanadium components. The regenerated catalyst containing vanadium is considered to meet applicants' non-lanthanide component limitation. Applicants have not shown anything unexpected with respect to the use of a catalyst containing a vanadium component.

It is noted that the reference does not refer to a reduction in the sulfur concentration of the feed. However, the reduction sulfur in the feed would naturally result from the use of a catalyst produced by the modified teachings of Beck et al.(4,588,702) because the modified

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teachings encompass a catalyst corresponding to that claimed by applicants which would display the same sulfur reductive properties.

In addition, applicants' catalyst method of making limitations in new claims 36-41 are not considered to distinguish the claimed invention because such limitations are considered to be product by process limitations. The product by process limitations fail to encompass "structural limitations" which would distinguish the claimed invention. It appears that the final composition prepared by applicants' product by process limitations corresponds to that disclosed by the applied art.

Claim Rejections - 35 U.S.C. § 103

Claims 9 and 39 rejected under 35 U.S.C. 103(a) as being unpatentable over Beck et al.(4,588,702) in view Kugler (4,944,864) as applied to claims 1-3, 5, 7, 8, 10, 28-31 and 36-38 above in further view of Cooper et al.(5,601,798).

-See teachings of Beck et al.(4,588,702) and Kugler (4,944,864) above.

Several differences are noted between the modified teachings of Beck et al.(4,588,702) and applicants' claimed invention. The reference does not disclose the specific unit cell size or $\text{SiO}_2/\text{Al}_2\text{O}_3$ ratio of the USY composition.

The reference of Cooper et al.(5,601,798) is cited to illustrate that USY typically has a unit cell ranging from 24.5 angstroms (2.45 nm) to 24.6 angstroms (2.46 nm) and a silica/alumina ratio ranging from 5-12. See column 4, lines 64-66.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the unit cell size and the $\text{SiO}_2/\text{Al}_2\text{O}_3$ ratio disclosed by the reference of Cooper et al.(5,601,798) for the USY catalyst used in the Beck et al. process because the reference of Cooper et al.(5,601,798) illustrates that such a unit cell size and a $\text{SiO}_2/\text{Al}_2\text{O}_3$ ratios

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are conventional in the art. Since the reference of Beck et al.(4,588,702) does not limit the parameters of the USY, it is considered to encompass conventional parameters which would accomplish the desired conversion. Applicants have not shown anything unexpected with respect to the claimed unit cell size or $\text{SiO}_2/\text{Al}_2\text{O}_3$ of the USY component.

Claim Rejections - 35 U.S.C. § 103

Claims 11, 12, 14, and 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beck et al.(4,588,702) in view of Kugler (4,944,864) as applied to claims 1-3, 5, 7, 8, 10, 28-31 and 36-38 above in further view of Occelli (4,615,996).

-See teachings of Beck et al.(4,588,702) and Kugler (4,944,864) above.

A difference is noted between the reference of Beck et al.(4,588,702) and applicants' claimed invention. The reference of Beck et al.(4,588,702) is silent with respect to the catalyst particle size.

The reference of Occelli (4,615,996) is cited for the general teaching that it is conventional in the art to use catalysts with particle sizes of less than 75 microns in FCC processes. See column 1, lines 25-30 and lines 35-40.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a catalyst particle size of less than 75 microns in the Beck et al. process because the reference of Occelli (4,615,996) illustrates that such catalyst particle sizes are conventional in the art for hydrocarbon cracking. Applicants have not shown anything unexpected with respect to the size of the catalyst particles.

In addition, the particle size is not considered to be a patentable distinction over the applied art because changes in size are not invention of a rule. In re Rose, 105 USPQ 237 (CCPA 1955).

Claim Rejections - 35 USC § 103

Claim 15 and 40-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combined teachings of Beck et al.(4,588,702), Kugler (4,944,864) and Occelli (4,615,996) and further in view of Cooper et al.(5,601,798).

See obvious statement for Cooper (unit cell) and Occelli (particle size) above.

Claim Rejections - 35 USC § 103

Claims 1-3, 5-8, 10-12, 14, 16-19, 28-31 and 36-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Balko et al.(5,956,474) in view of Schorfheide (4,690,806) and Kugler (4,944,864).

The reference of Balko et al.(5,965,474) discloses a composition for use in catalytic cracking. See abstract, lines 1-2. The composition comprises a faujasite such as USY, ZSM-5 and/or zeolite beta. See column 4, lines 11-39. The feeds processed are conventional feeds such as gas oil or vacuum gas oil. See column 4, lines 1-10. Contaminating metals such as vanadium and organic compounds are present. See column 2, lines 23-34. The reference discloses a gas oil feed containing sulfur. See column 21, lines 3-4 and 20. The reference also teaches that conventional FCC catalysts have particle diameters ranging from about 20-150 microns. See column 2, lines 5-10. Balko et al.(5,965,474) further teaches that the catalyst can be ion exchanged with additional metals such as Zn. See column 12, lines 24-36.

The reference of Balko et al.(5,965,474) succeeds at disclosing a cracking process involving the use of a catalyst with components corresponding to those claimed by applicants.

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Several differences are noted between the reference of Balko et al.(5,965,174) and applicants' claimed inventions. The reference of Balko et al.(5,965,174) is silent about sulfur in the form of organosulfur compounds and the sulfur reduction of the feed. In addition, Balko et al.(5,965,174) does not disclose a vanadium catalyst component, catalyst regeneration or sulfur reduction. In addition, the reference does not suggest applicants' catalyst method of making limitations.

The reference of Schorfheide (4,690,806) illustrates that gas oil is known to contain organosulfur compounds in the form of thiophenes and benzothiophenes. See column 2, lines 17-22.

The reference of Kugler (4,944,864) is cited to show that it is known in the art that vanadium contaminants in a hydrocarbon feed which remain on a catalyst during regeneration are oxidized and that the oxidized vanadium compounds become mobile and react with the zeolite components of the catalyst. As a result, the regenerated catalyst contains vanadium. See column 4, lines 13-27.

The reference of Kugler succeeds in disclosing the concept that oxidative regeneration is conventional for FCC catalysts and that regenerated catalysts which are recycled in processes involving the treatment of vanadium containing feeds contain an oxidized vanadium component resulting from contamination during the regeneration process.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to regenerate the catalyst of Balko et al.(5,965,474) because Kugler (4,944,864) illustrates that it is conventional in the art to oxidatively regenerate FCC catalysts.

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Since the reference of Balko et al.(5,965,474) discloses a vanadium containing feed, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a vanadium containing catalyst because the reference of Kugler teaches that it is known in the art that regenerated catalysts recycled for further cracking contain vanadium components. Applicants have not shown anything unexpected with respect to the use of a catalyst containing a vanadium component. Furthermore, the modified teachings of Balko et al.(5,965,174) would naturally encompass sulfur reduction because the reference discloses the use of a catalyst with the same components claimed by applicants which would have the same sulfur reduction catalytic properties.

Since Balko et al.(5,965,174) involves the treatment of a gas oil, it would have been obvious to one of ordinary skill in the art at the time the invention was made to treat an organosulfur containing feed according to the cracking process of Balko et al.(5,965,174) because the reference of Schorfheide (4,690,806) illustrates that gas oils are known to contain organosulfur compounds. Furthermore, the modified teachings of Balko et al.(5,965,174) would naturally encompass sulfur reduction because the reference discloses the use of a catalyst with the same components claimed by applicants which would have the same sulfur reduction catalytic properties.

In addition, applicants' catalyst method of making limitations in new claims 36-41 are not considered to distinguish the claimed invention because such limitations are considered to be product by process limitations. The product by process limitations fail to encompass "structural limitations" which would distinguish the claimed invention. It appears that the final

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composition prepared by applicants' product by process limitations corresponds to that disclosed by the applied art.

Claim Rejections - 35 USC § 103

Claims 9, 15, and 39-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Balko et al.(5,965,474) in view of Schorfheide (4,690,806) and Kugler (4,944,864) as applied to claims 1-3, 5-8, 10-12, 14, 16-19, 28-31 and 36-38 above, and further in view of Cooper et al.(5,601,798).

A difference is noted between the modified teachings of Balko et al.(5,965,474) and applicants' claimed invention. The modified teachings of Balko et al.(5,965,474) are silent about the unit cell size and silica/alumina ratio of the USY component.

The reference of Cooper et al.(5,601,798) is cited to illustrate that USY typically has a unit cell ranging from 24.5 angstroms (2.45 nm) to 24.6 angstroms (2.46 nm) and a silica/alumina ratio ranging from 5-12. See column 4, lines 64-66.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to select the unit cell size and the $\text{SiO}_2/\text{Al}_2\text{O}_3$ ratio disclosed by the reference of Cooper et al.(5,601,798) for the USY catalyst used in the Balko et al.(5,965,474) process because the reference of Cooper et al.(5,601,798) illustrates that such unit cell sizes and $\text{SiO}_2/\text{Al}_2\text{O}_3$ ratios are conventional in the art. Since the reference of Balko et al.(5,965,474) does not limit the parameters of the USY, it is considered to encompass conventional parameters which would accomplish the desired conversion. Applicants have not shown anything unexpected with respect to the claimed unit cell size or $\text{SiO}_2/\text{Al}_2\text{O}_3$ of the USY component.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1, 2, 4, 5, and 10-14 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-3, 8-10 and 12 of copending Application No. 09/221,539 in view of Beck et al.(4,588,702).

Although the conflicting claims are not identical, they are not patentably distinct from each other because both sets of claims are drawn to a process for reducing the sulfur content of a catalytically cracked petroleum feed fraction in the presence of a cracking catalyst and a product sulfur reduction catalyst.

A difference is noted between the present claims and the claims of Application No. 09/221,539. Claim 1 of Application No.09/221,539 includes an additional rare earth component.

The reference of Beck et al.(4,588,702) teaches that rare earth components are known promoters in catalytic cracking processes. See column 9, lines 30-35 and column 10, lines 49-55.

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It would have been obvious to one of ordinary skill in the art at the time the invention was made to include an additional rare earth component in the present claims because Beck et al.(4,588,702) illustrates that rare earths are known promoters in catalytic cracking.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Double Patenting

Claims 1-5 and 10-12 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-4 and 8-10 copending Application No. 09/221,540 in view of Beck et al.(4,588,702).

Although the conflicting claims are not identical, they are not patentably distinct from each other because both sets of claims are drawn to a process for reducing the sulfur content of a catalytically cracked petroleum fraction.

A difference is noted between the present claims and the claims of 09/221,540. The present claims do not include a cerium component as defined in the claims of 09/221,540.

The reference of Beck et al.(4,588,702) teaches that rare earth components(cerium) are known promoters in catalytic cracking processes. See column 9, lines 30-35 and column 10, lines 49-55.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include an additional cerium component in the present claims because Beck et al.(4,588,702) illustrates that rare earths are known promoters in catalytic cracking.

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This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Response to Arguments

Applicants' arguments filed 6-14-02 in paper no. 19 have been fully considered but they are not persuasive.

Applicants' arguments asserting that the reference of Beck et al.(4,588,702) does not appear to use ZSM-5 in combination with USY are not persuasive in overcoming the rejection. In response, it is maintained that that the applied art suggests the use of each individual component. It is obvious to use any combination components known to be effective for the disclosed conversion. Applicants have not shown anything unexpected with respect to the specific combination of ZSM-5 and USY.

Applicants' arguments asserting that that the teachings of Beck et al.(4,588,702) or Balko (5,965,474) and Kugler (4,944,864) do not suggest that vanadium is present in the interior pore structure of a molecular sieve in an oxidation state greater than 0 are not persuasive. In response, it is maintained that vanadium would be present in an oxidation state greater than 0 because vanadium is oxidized during regeneration producing vanadium in a positive oxidation state (i.e. vanadium oxide). Furthermore, applicants' assertion that the pore structure collapses/degrades is not sufficient to overcome the pending rejection. In response, it is maintained that the vanadium is still considered to be contained in the interior pore structure of the catalyst composition regardless of whether or not the catalyst is partially amorphous because the applied art suggests the migration of vanadium to the internal pore structures. Furthermore, the degradation of the

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crystalline composition occurs over time. As a result, newly oxidized vanadium can be contained in a pore prior to the degradation of the surrounding crystalline zeolite.

In addition, applicants' catalyst method of making limitations in new claims 36-41 are not considered to distinguish the claimed invention because such limitations are considered to be product by process limitations. The product by process limitations fail to encompass "structural limitations" which would distinguish the claimed invention. It appears that the final composition prepared by applicants' product by process limitations corresponds to that disclosed by the applied art.

Applicants' arguments against the double patenting rejections over 09/221,539 and 09/221,540 are not persuasive. Applicants assert that there is no suggestion to employ cerium or lanthanum in combination with the claimed vanadium sulfur reduction component. In response, it is maintained that applicants are directing arguments at a different reason for combining references than that applied by the examiner. It is maintained that it is not required for the secondary reference of Beck et al. to suggest the desirability of cerium or lanthanum with vanadium in order to be a proper combination. The reference of Beck is considered to be a proper combination with the claims of 09/221,539 and 09/221,540 because the teachings of Beck remedy the deficiency of the claims with respect to the presence of cerium or lanthanum rare earths. One of ordinary skill desiring increased cracking in the claims of 09/221,539 and 09/221,540 would be motivated to include cerium or lanthanum rare earths in order to promote a greater degree of cracking.

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Furthermore, applicants' comments regarding the cited reference of Guthrie have been noted. However, such comments are moot at the present time since the reference of Guthrie is not currently applied in any of the pending rejections.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nadine Norton whose telephone number is 703-305-2667. The examiner can normally be reached on Monday through Thursday from 8:30 am to 7:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola be reached on 703-308-6824. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-0661.

N.N.

December 9, 2002

NADINE G. NORTON
PRIMARY EXAMINER

